

## Technology-Based Standards Under Different Federal Environmental Statutes

Statute	Technology Standard-setting Provision	Decision Rule	Comments
Clean Air Act	New Source Performance Standards (NSPS) (for new sources)	Best Demonstrated Technology (BDT)	Degree of emission limitation achievable through the application of the best system which (taking into account cost and any nonair quality health and environmental impact and energy requirements) the Administrator determines has been adequately demonstrated. Technology may not be one that is purely theoretical but it can be a result of technology forcing. The EPA may make a projection based on existing technology, though that projection is subject to the restraints of reasonableness and cannot be based on crystal ball inquiry. Can do work practice standards if performance standard infeasible. Creates a floor for New Source Review.
Clean Air Act	Innovative Technology Waivers	Designed to allow testing of control systems that might prove to achieve greater reductions than the NSPS.	Not used very often or successfully.
Clean Air Act	111(d) ("NSPS" for existing sources)	Similar criteria to NSPS	EPA establishes emission guidelines for existing sources which must be implemented by states. Only applies to a limited set of sources (non-criteria, non-hazardous)

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Clean Air Act	New Source Review (NAAQS <sup>1</sup> attainment areas)	Best Available Control Technology (BACT)	<p>--Case by case review</p> <p>--Maximum degree of reduction achievable taking into account energy, environmental and economic impacts and other costs</p> <p>--EPA recommended top-down process for BACT determination:</p> <p>Step 1: Identify available pollution control options</p> <p>Step 2: Eliminate technically infeasible options</p> <p>Step 3: Rank remaining control technologies by control effectiveness</p> <p>Step 4: Evaluate the most effective controls (considering energy, environmental, and economic impacts) and document the results.</p> <p>Step 5: Make the BACT selection.</p>
Clean Air Act	New Source Review (NAAQS non-attainment areas)	Lowest Available Emission Rate (LAER)	The most stringent emission limitation which is contained in the implementation plan of any State for such class or category of source, unless the owner or operator of the proposed source demonstrates that such limitations are not achievable; or the most stringent emission limitation which is achieved in practice by such class or category of source. Similar analysis to BACT, except no consideration of economic, energy or environmental factors.
Clean Air Act	State Implementation Plans (SIPs) for existing sources to meet NAAQS	Reasonably Available Control Technology (RACT) and Reasonably Available Control Measures (RACM)	Lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.
Clean Air Act	RACT/BACT/LAER Clearinghouse	Database of state air permitting decisions	Essentially a benchmarking tool for state agencies and permit applicants

<sup>1</sup> National Ambient Air Quality Standards

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Clean Air Act	Air Toxics Emission Standards for major sources	Maximally Available Control Technology (MACT)	Maximum degree of reductions and emissions deemed achievable for the source category or subcategory that, taking into consideration the cost of achieving the reduction, any non-air-quality health and environmental impacts and energy requirements, is achievable for new or existing sources. MACT floor for new sources is the emission control that is achieved in practice by the best controlled similar source. MACT floor for existing sources is the average emission limitation achieved by the best performing 12 percent of the existing sources; or if fewer than 30 sources, the best performing 5 sources. EPA says 94 <sup>th</sup> percentile (others say 88 <sup>th</sup> ).
Clean Air Act	Air Toxics Emission Standards for some area sources	Generally Available Control Technology (GACT)	Agency has broad discretion. No floor analysis or minimum control requirement.
Clean Air Act	Vehicle and engine standards		Mostly federal, but CA allowed to continue to be laboratory. Generally Congress set specific limits for light duty vehicles but allowed for suspension if technology not available. More flexibility for heavy duty engines: the greatest degree of emission reduction achievable from available technology giving appropriate consideration to cost, energy and safety factors; manufacturers may bank and trade emission credits. The EPA generally follows international standards for aircraft emissions.
Clean Air Act	Fuel standards		EPA can regulate based on (1) public health impacts or (2) impacts on pollution control equipment. Under (1) can only consider health and other means of achieving standard. Under (2) must do cost-benefit analysis. Also Congress specified many rules.

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Clean Water Act (CWA)	National Pollutant Discharge Elimination System (NPDES) permit (including both technology-based effluent standards and water quality-based standards)	Best practicable control technology currently available (BPT)	The first level of technology-based standards established by the CWA to control pollutants discharged to U.S. waters. This standard is used for conventional, toxic, and nonconventional pollutants and is applied to existing dischargers. BPT limit guidelines are generally set using the average of the best existing performance by plants within an industrial category or subcategory. EPA must conduct a cost-benefit analysis in setting BPT standards. All regulated industries have a BPT standard, and then industries may also have BAT and/or BCT standards set (see below).
Clean Water Act	National Pollutant Discharge Elimination System (NPDES) permit (including both technology-based effluent standards and water quality-based standards) <sup>2</sup>	Best conventional pollutant control technology (BCT)	Technology-based standard for conventional pollutants only and applicable to existing dischargers. Rather than a standard cost-benefit analysis, BCT is established using a two-part "cost reasonableness" test which compares the cost for an industry to reduce its discharges with the cost to a publicly owned treatment works (POTW) for similar levels of reduction. The second test examines the cost-effectiveness of additional treatment beyond the best practicable control technology (BPT; see above). EPA must find limits which are reasonable under both tests before establishing them as BCT. Generally, BCT represents the best existing treatment technologies that are economically achievable within an industrial category.

<sup>2</sup> Effluent limitations serve as the primary mechanism in NPDES permits for controlling discharges of pollutants. When developing effluent limitations for an NPDES permit, permit writers must consider limits based on both the technology available to control the pollutants (i.e., technology-based effluent limits) and limits that are protective of the water quality standards of the receiving water (i.e., water quality-based effluent limits).

The intent of technology-based effluent limits in NPDES permits is to require a minimum level of treatment of pollutants for point source discharges based on available treatment technologies, while allowing the discharger to use any available control technique to meet the limits. For industrial (and other non-municipal) facilities, technology-based effluent limits are derived by using [national effluent limitations guidelines](#) and standards established by EPA, and/or using best professional judgment (BPJ) on a case-by-case basis in the absence of national guidelines and standards.

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Clean Water Act	National Pollutant Discharge Elimination System (NPDES) permit	Best available technology economically achievable (BAT)	Technology-based standard for toxic and nonconventional pollutants and applicable to existing dischargers; established as the most appropriate means available for controlling the direct discharge of toxic and nonconventional pollutants. BAT effluent limitations guidelines generally represent the best existing performance of treatment technologies that are economically achievable within an industrial category. EPA must consider costs in setting BAT, but does not have to weigh them against the benefits of effluent reduction.
Clean Water Act	National Pollutant Discharge Elimination System (NPDES) permit	New source performance standards (NSPS)	Technology-based standard for conventional pollutants and applicable to new sources. Standards consider that the new source facility has an opportunity to design operations to more effectively control pollutant discharges.
Resource Recovery and Conservation Act (RCRA) – Hazardous and Solid Waste Amendments (HSWA)	Land Disposal Restriction (LDR) treatment standards	Best Demonstrated Available Technologies (BDAT)	Technology-based treatment standards for hazardous waste. BDAT can be expressed either as a performance standard (based on a maximum allowable concentration of particular wastes) or as a specific technology or practice. These standards are determined through a process that involves dividing wastes into similar groups; assessing technologies based on availability, performance, and quality; and testing to determine the “best” technologies.